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Chair
Councillor Paul Ainslie
Interim Chief Executive Officer
Robin D. Hale

2018-03-15

REQUEST FOR PROPOSALS
SWISS CHALLENGE - PROVIDING AND MAINTAINING
MAGLEV TRANSIT SYSTEM
SC-RFP # 01 (2018-03)

The Toronto Zoo has received an unsolicited proposal to provide and maintain a magnetic levitation powertrain (maglev) transit system on a revenue basis to the Toronto Zoo (refer to the attached unsolicited proposal from the Magnovate Transportation Inc). The Zoo has decided to proceed with a Swiss Challenge process as defined herein. Interested Proponents are to provide full details on construction, operations and maintenance of equipment and a financial plan which includes the financing model and revenue share to the Toronto Zoo.

Proposal: The proposal should be submitted using a two envelope system (One for the Technical proposal and the second for the Financing Model and Revenue proposal). The sealed Technical Proposal shall be submitted in **Envelope 1** using the label provided and the sealed Financing Model and Revenue Proposal shall be submitted in **Envelope 2** using the label provided. In each envelope, provide **five (5)** copies of each respective proposal (Technical and Financing)**, one (1)** unbound signed and clearly marked as ORIGINAL and **four (4**) copies of the original proposal clearly marked as COPY. Additionally each envelope should include one (1) electronic copy (Microsoft Word or PDF) on a CD or flash drive. The original and all copies should be identical (excluding any obvious differences in labeling as noted above). Proposal is to be delivered to the office of Purchasing & Supply, Toronto Zoo, Administrative Support Centre, 361A Old Finch Ave., Toronto, Ontario, M1B 5K7 by:

Due Date: **Tuesday, 2018-04-17, by 1200 hours (noon), local time**

Proposals shall remain in effect for a period of one hundred and twenty (120) days from the Proposal due date.

The Board of Management of the Toronto Zoo reserves the right to reject any or all Proposals or to accept any Proposal, should it deem such action to be in its interests.

If you have any queries regarding this request for proposal, please contact Mr. Peter Vasilopoulos, Supervisor of Purchasing & Supply at 416 392-5916 or pvasilopoulos@torontozoo.ca. If you require further technical details, please contact Paul K.Whittam, Interim Director – Administrative Services at 416 392-5914 or pwhittam@torontozoo.ca.

Yours truly,

Paul K. Whittam
Interim Director – Administrative Services

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1.0 INSTRUCTIONS

1.1 Review the Request for Proposal (RFP) issued and requirements within and return your complete proposal with the enclosed SUBMISSION FORMS by the due date and time.

1.2 Every proponent is responsible for conducting its own investigations and due diligence necessary for the preparation of this Proposal.

1.3 A site (proposal) meeting is scheduled, for Thursday, 2018-03-22. This meeting is optional and will be the only date scheduled, and for consistency there will be no individual proponent meetings. **Proponents interested in attending this site visit are requested to register in advance no later than Tuesday 2018-03-20 with Peter Vasilopoulos, Supervisor of Purchasing and Supply at the email address or telephone number in section 1.14.**

1.4 Your sealed proposal must be completed, and received by Purchasing & Supply, Toronto Zoo, Administrative-Support Centre, 361A Old Finch Ave., Toronto, Ontario, M1B 5K7 by **Tuesday 2018-04-17 1200 hours (noon, local time)** or your proposal will not be considered.

1.5 Provide **five (5)** copies of your proposal**, one (1)** unbound signed and clearly marked as ORIGINAL and **four (4**) copies of the original proposal clearly marked as COPY and one (1) electronic copy (Microsoft Word or PDF) on a CD or flash drive in a sealed package or envelope. The original and all copies should be identical (excluding any obvious differences in labeling as noted above).

1.6 Proposals must not be submitted by facsimile or email.

1.7 Use the attached submission label when you submit your response in a sealed envelope or package and deliver to the Toronto Zoo.

1.8 The person(s) authorized to sign on behalf of the Proponent and to bind the Proponent to statements made in response to this Request for Proposal must sign the proposal.

1.9 All copies of all pages of the Proposal should be printed in duplex (i.e. on both sides of the pages) and 11 point font.

1.10 All proposals will be irrevocable for a period of one hundred and twenty (120) days from the date of the proposal submission deadline.

1.11 Unless otherwise indicated herein, the prices stated are payable in Canadian Funds, HST excluded.

1.12 The exchange rate for any foreign currency will be determined using the Bank of Canada daily rate.

1.13 If it becomes necessary to revise any part of this RFP, the revisions will be by Addenda emailed to the Proponent or posted on the Toronto Zoo website. Proponents and prospective Proponents SHOULD MONITOR THIS SITE on a frequent basis through to the date of the submission deadline. Only answers to issues of substance will be posted. The Toronto Zoo reserves the right to revise this RFP up to the Closing Deadline. When an addendum is issued is issued the Closing date for submitting proposals may be revised by the Toronto Zoo if, in its opinion, determines more time is necessary to enable Proponents to submit their Proposals. All Proponents must acknowledge receipt of all Addenda in the space provided on the Proposal Submission Form.

1.14 If you have any other inquiries about the proposal or contract inquiries, please contact

Peter Vasilopoulos,
Supervisor, Purchasing & Supply,
(416) 392-5916
pvasilopoulos@torontozoo.ca

2.0 DEFINITIONS

2.1 The following definitions will apply to this Request for Proposal and to any subsequent Contract:

2.1.1 "**Agreement**" means any written contract between the Toronto Zoo and a Proponent or any purchase order issued by the Toronto Zoo with respect to the Services contemplated by this RFP, and shall be deemed to include the terms and conditions for the provision of the Services as set out in this RFP;

2.1.2 "**Board**" means the Board of Management of the Toronto Zoo;

2.1.3 **"CEO"** means the Chief Executive Officer of the Toronto Zoo;

2.1.4 **"COO"** means the Chief Operating Officer, or designate, of the Toronto Zoo;

2.1.5 "**Contract**" means acceptance by the Toronto Zoo (by way of written acknowledgement, Agreement, Contract or Purchase Order) to furnish Services for money or other considerations;

2.1.6 **"Preferred Proponent"** means the Proponent whose Proposal, as determined by Toronto Zoo staff through the evaluation analysis described in the RFP, provides the best overall value in meeting the Toronto Zoo's requirements and may be recommended for award;

2.1.7 **"Proponent"** means an individual or company that submits or intends to submit, a proposal in response to this Request for Proposal;

2.1.8 "**Proposal**", means an offer submitted by a Proponent in response to a formal RFP which includes all of the documentation necessary to satisfy the submission requirements of this RFP;

2.1.9 **Request for Proposal (RFP)"** means the RFP document in its entirety, inclusive of any addenda that may be issued by the Toronto Zoo;

2.1.10 "**Services" or "Work**" means everything that is necessary to be performed, furnished delivered by the Vendor as described in tis RFP;

2.1.11 "**Swiss Challenge**" means a form of RFP in public procurement, whereby a government affiliated entity (Board, Agency, etc.), which has received an unsolicited proposal from a proponent for a project or services to be provided to the entity, publishes the unsolicited proposal and invites third parties to match or better it. The proponent which submitted the unsolicited proposal is then offered the opportunity to match or better the best bid which comes out of the Swiss challenge process;

2.1.12 **"Vendor"** means the successful Proponent with whom the Toronto Zoo enters into an Agreement.

3.0 PURPOSE

3.1 The Swiss Challenge process provides the Toronto Zoo with a method for receiving unsolicited proposals and then offer others an opportunity to improve on the unsolicited proposal by offering a counter-proposal, while at the same time protecting the ability of the unsolicited participant to match any other competing counter-proposal.

The purpose of this RFP is to invite counter-proposals to the unsolicited proposal received from Magnovate Transportation Inc. (copy appended to this RFP) for providing and maintaining a magnetic levitation (maglev) powertrain transit system on the Toronto Zoo site, while guaranteeing annual future net revenue to the Toronto Zoo all at no risk to the Zoo. The Magnovate proposal is of interest as it presents an innovative, environmentally friendly, and technologically advanced transit system that is quiet and results in zero emissions. The details of the unsolicited proposal are described herein.

This RFP process is governed by the terms and conditions included herein and is intended to be consistent with the swiss challenge process of the City of Toronto, as guided by the City policy *Process for Receiving and Reviewing Unsolicited Quotations and Proposals.* The protocol as outlined, which supplements the City's *Unsolicited Quotations or Proposals Policy* establishes a framework through which external organizations seeking to do business with the City and its Agencies, Boards, and Commissions, outside of the conventional procurement system, are given an opportunity to have their ideas presented and evaluated. The respective policies above may be accessed through the following links: *(http://www.toronto.ca/calldocuments/pdf/unsolicited.pdf), (http://www.toronto.ca/top/pdf/policy.pdf).* Complete details of the City's Swiss Challenge procedure may be found at: *http://www.toronto.ca/top/pdf/swiss-challenge-procedure.pdf.*

3.2 **Background**

Magnovate was founded to commercialize Magline, a proprietary magnetic levitation (maglev) powertrain platform that enables a whole new generation of advanced transit systems. They are the epicentre of a consortium that includes several large international industrial leaders who are all committed to creating a complete maglev transportation industry in Canada. The technology is a breakthrough development magnetic levitation (maglev) propulsion. It is a silent, frictionless and highly energy efficient powertrain that can run without recourse to carbon-based fuels. Solar panels mounted on stations and on other elements of the infrastructure can supply much of the system's day-to-day power requirements.

As part of the commitment to further maglev transportation options in Canada, Magnovate researched possibilities for the optimal location to create a demonstration site to exhibit the technology. As such, Magnovate determined that the original Domain Ride (also referred to as the "monorail") route and guideway at the Toronto Zoo would be a suitable site for this purpose and ultimately for showcasing a fully functional Maglev powertrain ride. Although the costs to retrofit the original monorail tracks and guideway are significant, Magnovate would efficiently utilize much of the existing infrastructure to avoid the additional incremental costs to construct a completely new system.

The ultimate objective of Magnovate is to exhibit the technologies and create a new attraction for Zoo visitors to ride the first commercial maglev transit system in North America.

If it is determined that a counter-proposal is superior to the original unsolicited proposal from Magnovate, then Magnovate shall be provided with details of the preferred counter-proposal and shall be given the opportunity to match or improve on the selected counter-proposal. Magnovate shall have thirty (30) business days to match or improve the selected counter-proposal. Any final

award will be subject to approval by the Board. If Magnovate matches or improves the counter-proposal, staff may recommend to the Board that negotiations continue with Magnovate. If however, Magnovate does not match or improve the selected counter-proposal, it may be recommended that negotiations be undertaken with the Proponent of the selected counter-proposal with the objective of entering into an agreement based on the proposal submission, as may be amended through the negotiation process.

4.0 SCOPE OF WORK

4.1 Interested proponents are asked to review the Magnovate proposal (included with this RFP) in detail and submit a comprehensive counter-proposal for a similar ride attraction that will essentially achieve a better the result for the Toronto Zoo.

Interested Proponents are expected to provide an innovative, environmentally friendly, and technologically advanced solution in their proposal, similar to the degree and magnitude of the Magnovate proposal. Proponents should also provide sufficient detail in their submission that is at a level comparable to that outlined in the Magnovate proposal, including but not limited to the following and subject to the Proponent Submission Requirements included in this RFP document.

4.2 Construction Methodology and Project Schedule.

4.3 Equipment – Operations & Maintenance (including safety and customer service).

4.4 Financial Benefit to the Toronto Zoo.

4.5 Full details on overall methodologies for Financing the project.

Subject to site work necessary to implement, the Vendor is expected to have magnetic levitation powertrain transit system or similar transportation system fully tested and ready for operation to the satisfaction of the Toronto Zoo within 3 years of being selected.

4.6 Term

The term of the initial agreement is for five (5) years with an option to renew for an additional five (5) years subject to approval by the **Board**

5.0 PROPONENT SUBMISSION REQUIREMENTS

5.1 **General Overview**

The Toronto Zoo has formulated the procedures set out in this RFP to ensure that it receives Proposals through an open, competitive process, and the Proponents receive fair and equitable treatment in the Swiss Challenge Process, receipt and evaluation of their Proposals. The Toronto Zoo has engaged the services of a Fairness Monitor / Commissioner to monitor the Swiss Challenge process. The Toronto Zoo may reject the Proposal of any Proponent who fails to comply with any such procedures.

Proposals must address the RFP content requirements as outlined herein, must be well ordered, detailed and comprehensive. Clarity of language, adherence to suggested structuring and adequate accessible documentation is essential to the Toronto Zoo's ability to conduct a thorough evaluation. The Toronto Zoo is interested in proposals that demonstrate efficiency and value for money. General marketing and promotional material will not be reviewed or considered.

5.2 **Mandatory Requirements**

A mandatory requirement is a minimum need that must be met by the Proponent. The Toronto Zoo will eliminate from the evaluation process any Proponent not fulfilling the mandatory requirements. Failure to meet mandatory requirements is grounds for a submission to be declared informal/disqualified.

In addition to the Proposal requirements that follow, it is mandatory that the Proponent provide clear evidence of the ability to deliver on all aspects of the details in its proposal on the timelines they propose. Additionally, the Proponent must clearly indicate its ability to deliver on projects of comparable magnitude to the Magnovate proposal, through the inclusion and business case descriptions and references for projects successfully undertaken and completed by the Proponent.

5.3 **Proposal Documentation and Delivery**

The documentation for each Proposal (Technical submission vs Financial submission) will be in two separate envelopes:

a) Must be submitted in a sealed envelope or container (submissions made by fax, telephone, electronic message or telegram will not be accepted) displaying a full and correct return address.
b) Should be succinct and to the point, 20 - 30 pages in length, double sided, minimum 11 point font, plus appendices.
c) Must consist of one (1) original (clearly marked as such on its first page) and preferably four (4) full copies of:

   (i) A **Main Proposal Document** as described in the section below titled **Proposal Content,** including all attachments and appendices as required. (**Mandatory**)
   (ii) **Proposal Form (Section 9.0)** completed and signed by an authorized official of the Proponent. (**Mandatory**)
   (iii) **Form 1 (Policy to Exclude Bids from External Parties involved in the Preparation or Development of a Specific Call/Request)** completed as indicated **(Mandatory)**
   (iv) **Form 2 (Environmentally Responsible Procurement Statement)** completed as indicated, if applicable.

5.4 **Proposal Content**

The proposal should contain the following information:

The proposal should contain the following items:

Letter of Introduction – Introducing the Proponent and signed by the person(s) authorized to sign on behalf of and to bind the Proponent to statements made in response to this RFP. This should contain the same signature as the person signing the submission forms.

Table of Contents – Include page numbers and identify all included materials in the proposal submission.

Section 1 – Executive Summary

Proponents should provide a summary of the key features of the proposal.
Section 2 – Proponent Profile

Proponents should have the staff and organization to ensure their ability to deliver and support the proposed project.

1. To permit the Proponent to be evaluated fully as a viable and sound enterprise, include the following information with respect to the Proponent, and if the submission is a joint Proposal, for each consortium member. Please note that where Proposals are being submitted by consortiums, the information requested should be provided for each consortium member.

    (a) A profile and summary of corporate history including:

    - date company started;
    - products and/or services offered;
    - total number of employees;
    - major clients; and
    - business partners and the products/services they offer;

    (b) A profile and summary of corporate history of any parents or subsidiaries and affiliates and the nature of the Proponent's relationship to them (i.e., research, financing and so on).

2. If the proposal is being presented by a consortium, provide a description of the relationships between consortium members.

Section 3 – Experience and Qualifications of the Proponent

1. It is important that the Work be undertaken by a Proponent who can demonstrate specific knowledge of, and experience in performing similar work for projects of comparable nature, size and scope. In particular, the Proponent should demonstrate the following in its Proposal:

    (a) Experience of the Proponent with other similar projects.

    (b) Necessary skills, experience and expertise in the design and delivery of the proposed Solution, and, based on these skills, experience and expertise, how they will ensure that the proposed goods and services are appropriate for the use to be made of them as set out in this RFP.

    (c) Provide a minimum of three (3) references for the purpose of evaluating the Proponent's experience and track record of success. Each reference should include:

    - the identity of the reference client organization;
    - a contact name and title, address and telephone number;
    - the size and nature of the client's business;
    - the number of years dealing with the client;
    - a description of the project;
    - the timing and duration of the Proponent's involvement in the project;
    - the services that were provided by the Proponent (i.e. installation, support, training and/or project management);
    - date of the project;
    - details regarding the scale of the project; and
    - client's URL address.

Please note that Proposals being presented by consortiums that do not include the information requested for each consortium member will not be awarded full marks during the evaluation process. In providing references, Proponents agree that the Toronto Zoo can contact the individuals provided as part of the evaluation process. The Toronto Zoo will make its own arrangements in contacting the references. Substitution of references will not be permitted after the close of the RFP.

Section 4 – Proposed Staff Team and Resources

1. It is important that the Work be undertaken by a staff team who can demonstrate specific knowledge of, and experience in performing similar work for projects of comparable nature, size and scope. In particular, the Proponent should provide the following in its Proposal:

    a) A list of key staff that the Proponent would propose to use for this work together with their professional qualifications, related project experience and an indication of their duties and responsibilities on this particular project.

    b) Include strategies and individuals that can fulfill the roles and responsibilities for any unforeseen events requiring replacement of team members.

    c) Resumes for proposed individuals are to be included as an Appendix to the proposal.

    d) Provide a statement of any conflict of interest, if applicable. Refer to section 7.12 for information relating to conflicts of interest.

Note: The Proponent should submit signed consent forms authorizing the disclosure of personal information to the Toronto Zoo, or its designated agent(s), for any resumes that are submitted, however, the Proponent will accept all liability if not disclosed to the Toronto Zoo.

It is important that key project individuals (i.e. major areas of responsibility) be named, with accompanying indication of guaranteed availability. Continuity of key personnel will be required, with a contractual obligation for substitutions only with full written approval of the Toronto Zoo.

Section 5 – Proposed Transportation System/Solution

1. Provide a statement outlining the nature of the proposed transportation System/Solution.

2. Provide a detailed business plan that demonstrates the viability of the proposal and provide an indication that all requirements identified in Section 3.0 will be met.

3. Identify the objectives and outcomes that the proposed transportation System/Solution will achieve.

4. Provide in-depth details on the Financing model for the project including any public sector funding / financing.

5. Outline the responsibilities of the Proponent and the Toronto Zoo respectively.

6. Provide revenue projections and cost estimates that demonstrate the viability of the proposed transportation System/Solution.

7. Provide a statement confirming that the Proponent has the right to represent, sell, license, deliver, install, train in the use of, service, maintain and support the products proposed, including any documentation to be provided in relation thereto.

8. Provide a statement confirming that the Proponent has the right to provide to the Toronto Zoo any required ownership, license rights, pass-through warranties and other ancillary rights for all proposed goods and services and that the provision of such products and services will not infringe or otherwise violate the rights of any third party.

Section 6 – Project plan and Deliverables

It is important that the project is started and completed in an efficient and effective manner. The Proponent is to provide:

1. Organization and team structure.

2. A detailed work plan indicating the project method, schedule, tasks, and deliverables.

3. An estimated overall timeline of the project, including an indication of how soon you could commence work.

4. Key dates for major deliverables must be clearly defined in the Proponent's detailed work plan.

5. Proposed project staffing over the assignment period.

6. A detailed Financial & Revenue Plan / Structure including details on financing, equity members, major participants and guarantors (if any), surety letter, and audited financial statements.

7. Revenue plan should include details of the proposed revenue to the Toronto Zoo on annual basis and appropriate details on pricing strategies.

8. State assumptions regarding roles and involvement of Toronto Zoo staff and the estimated amount of their time involvement.

Section 7 – Two –envelope system

The proposal should be submitted in two envelopes. The sealed Technical Proposal and the sealed Financing Model and Revenue Proposal shall be submitted in a sealed main envelope or package as shown below:

Using the labels provided within the RFP, each envelope within the main envelope or package must be sealed and clearly labelled as **Envelope 1 – Technical Proposal and Envelope 2 – Financing Model and Revenue Proposal** as outlined below.

Envelope 1 – Technical Proposal and shall contain:

(i) **five (5)** copies of your proposal**, one (1)** unbound signed and clearly marked as ORIGINAL and **four (4**) copies of the original proposal clearly marked as COPY and one (1) electronic copy (Microsoft Word or PDF) on a CD or flash drive in a sealed package or envelope. The original and all copies should be identical (excluding any obvious differences in labeling as noted above) (Note: both Technical and Financing proposals can be submitted as two documents on the same means of media).

A completed original signed Form of Proposal must be signed and returned with submission in Envelope 1. The Technical Proposal must be submitted in a sealed envelope

and clearly identified with the attached label "Envelope 1 – Technical Proposal" using the attached submission label. Envelope 1 is to be sealed and inserted in the Main envelope.

(ii) There should be no financial information submitted with Envelope 1; and

Envelope 2 – Financing Model and Revenue Proposal and shall contain:

All financial information and revenue details must be submitted in a sealed envelope clearly identified with the enclosed label "Envelope 2 – Financing Model and Revenue Proposal" using the attached submission label. Envelope 2 is to be sealed and inserted in the Main envelope.

Notes to Financing Model and Revenue Proposal:

Financing Model and Revenue Proposal details submitted in a Proponent's Envelope 2 are to be firm for the duration of the RFP process and the term of any resulting Agreement.

All amounts must be stated in Canadian currency. The Proponent shall assume all currency risk.

The Toronto Zoo shall not be responsible for any additional costs.

The Proponent shall be solely responsible for all costs including but not limited to, wages, salaries, statutory deductions, and any other expenses and liabilities related to its personnel, and sub-contractors and suppliers and their respective personnel.

The Proponent shall be solely responsible for any and all payments and/or deductions required to be made including, but not limited to, those required for the Canada Pension Plan, Employment Insurance, Workplace Safety and Insurance and Income Tax.

Without restricting the generality of the foregoing, the Proponent acknowledges that, if is a non-resident person, payments to the Proponent, as a non-resident entity, may be subject to withholding taxes under the Income Tax Act (Canada). Further, unless the Proponent, as a non-resident person, provides the Toronto Zoo with an official letter from Canadian Customs and Revenue Agency waiving the withholding requirements, the Toronto Zoo will withhold the taxes it determines are required under the Income Tax Act (Canada).

6.0 PROPOSAL EVALUATION AND SELECTION CRITERIA

6.1 The Proponent is encouraged to submit a complete and thorough proposal that addresses all requirements outlined in the RFP to ensure that its Proposal may receive maximum consideration in the evaluation process.

6.2 The Proposal may not be awarded to the Proponent with the lowest cost, but rather, award shall be based on an evaluation of the Proponents expertise, prior project experience, proposed methodology, and price; essentially an optimal value scenario. Additionally, the Zoo may accept or reject any part of the Proponent's bid.

6.3 An Evaluation Team comprised of representatives designated by the Zoo will evaluate responses to the RFP through a comprehensive review and analysis by a Evaluation Committee. The Evaluation Committee may at its sole discretion retain additional committee members or advisors.

The aim of the Evaluation Committee will be to determine if any of the counter-proposals are superior to the original unsolicited proposal. The counter-proposal selected, if any, will not necessarily be the one offering the highest revenue to the Toronto Zoo. Revenue to the Toronto Zoo is one of the components in determining the total score or ranking.

By responding to this RFP, Proponents will be deemed to have agreed that the decision of the Evaluation Committee will be final and binding.

6.4 There are three steps to the pre-defined evaluation process:

Step 1 – Initial Review of Responses
Step 2 – Evaluation of Submitted Proposals of Technical and Financial submissions (2 envelope system)
Step 3 – Evaluation of Presentations

6.5 Step 1 – Initial Review of Responses

The Zoo will open only those Proposals received by the Proposal Deadline and time specified within this RFP. Immediately upon opening, the Zoo will review each Proposal for compliance with the instructions and conditions applicable to this RFP including any mandatory requirements stated in Section 5. The Zoo, at its option, may seek Proponent retraction and clarification of any discrepancy/contradiction found during its review of Proposals.

6.6 Step 2 – Evaluation of Submitted Proposals

6.6.1 The Evaluation Team will evaluate each submitted Proposal, that has passed through Step 1, on criteria that will include, but not necessarily be limited to, the following:

Evaluation Criteria	Points will be Awarded for:	Points
Proposed Transportation Solution: Level of innovation, environmental and technological attributes included in the proposal in comparison to the Magnovate proposal	Responses that offer an innovative transportation solution that demonstrates comparable qualities and features presented in the Magnovate proposal and represent a high degree of environmental due diligence.	15
Proposed Project Plan: Proposed project schedule, project timelines, key dates of project milestones and deliverables.	Project plans that are well organized, logical and realistic as well as deliverables that are consistent with the Toronto Zoo's schedule and proposed dates and timelines that are achievable and practical.	10
Project Team: Composition of Project team (including ownership and role of each team member) and the depth and breadth of the Project team's relevant qualifications and experience in the design, build, finance, operation, and maintenance of a similar scale of transportation system.	Project Teams that are lean with well-defined roles. Points will also be awarded for team member that can demonstrate they have relevant experience managing similar projects, proper technical qualifications and expertise in multiple aspects of the project (i.e., design, build, finance, operations and maintenance).	20
Project Lead: Design and Build Qualifications of the Project Lead and overall experience	Project Lead who has at least ten years of relevant experience, who can demonstrate they have the appropriate technical skills and qualifications to successfully deliver the project on time and on budget.	20
Financing Model and Revenue Plan / Structure (separate envelope)	A financial plan that includes a reasonably detailed and acceptable financing model that includes a revenue share for the Toronto Zoo.	35
		100

6.6.2 The Zoo may, at its discretion, eliminate a Proposal from further consideration if it deems the overall cost to be prohibitive.

6.6.3 A short-list of suitable Proponents whose written Proposal has met or exceeded a minimum technical score of 65% may be invited to an interview with the Selection Committee for Step 3 to provide presentations related to their Proposal.

6.7 Step 3 – Interview and Evaluation of Presentations (If Required)

6.7.1 The purpose of the interview will be to allow the Proponent to make a brief presentation (of up to a maximum of 30 minutes) to support their Proposal and to expand on the

information contained in their Proposal, and to allow the Selection Committee to ask questions of the Proponent (of up to a further maximum of 30 minutes) regarding their Proposal.

6.7.2 The representative of a Proponent at any interview scheduled is expected to be thoroughly versed and knowledgeable with respect to the requirements of this RFP and the contents of its Proposal, and must have the authority to make decisions and commitments with respect to matters discussed at the interview, which may be included in any resulting Agreement.

6.7.3 The representatives designated by the Evaluation Committee in its invitation to the Proponent must attend any interview scheduled as part of this evaluation process.

6.7.4 Where the staff team proposed by the Proponent is an important element in the evaluation criteria, the staff team proposed shall be present for the interviews.

6.7.5 No Proponent will be entitled to be present during, or otherwise receive, any information regarding any interview with any other Proponent.

6.7.6 The Evaluation Committee may interview any Proponent(s) without interviewing others, and the Toronto Zoo will be under no obligation to advise those not receiving an invitation until completion of the evaluation and selection process.

6.7.7 Any and all costs incurred by the Proponent in order to prepare for and attend the presentation and/or demonstration including transportation, food, lodging, etc. shall be borne entirely by the Proponent.

The final score is then calculated as illustrated in the following table:

Evaluation	**Score**
Step 1 – Initial Review of Submitted Proposals	Prerequisite
Step 2 – Evaluation of Submitted Proposals	Maximum 100
Step 3 – Evaluation of Presentations (If Required)	(Maximum 50 If Required)
Total maximum score excluding Presentation	**100**
Total maximum score including Presentation	**150**

By responding to this RFP, Proponents will be deemed to have agreed that the decision of the Evaluation Committee will be final and binding.

All Proposals shall be submitted by the Proponent on the understanding that the Proposals shall become the property of the Zoo.

6.8 Evaluation Results

Upon conclusion of the evaluation process, a final recommendation will be made by the Evaluation Committee to the Board of Management.

Proposal evaluation results shall be the property of the Board and are subject to MFIPPA. Evaluation results may be subject to public release pursuant to MFIPPA.

7.0 SCHEDULE OF EVENTS

The following is a tentative schedule for the Swiss Challenge – Maglev Transit System process. The final schedule will be developed jointly with the successful proponent in the first week of project execution:

Pre-Award	
Release of RFP	2018-03-15
Site visit - optional	2018-03-22
Proponents' Question Deadline	2018-03-28
Addenda issued to answer questions (if necessary)	2018-04-05
Submission Due	2018-04-17
Interviews, if necessary	Week of 2018-04- 23
Notification of results by the Toronto Zoo	2018-04-30

The RFP process and project will be governed according to the above schedule or other schedule provided by the Proponent and approved by the COO of the Toronto Zoo. Although every attempt will be made to meet all dates listed, the Toronto Zoo reserves the right to modify any or all dates at its sole discretion. Appropriate notice of change will be provided, in writing, as soon as is feasible so that each Proponent will be given the same non-preferential treatment.

8.0 PROPOSAL TERMS AND CONDITIONS

The successful Proponent shall be retained through a contractual agreement and/or a purchase order, which includes the terms and conditions of this Request for Proposal.

8.1 **Insurance and Policies**

Provide minimum $5,000,000 Commercial Liability Insurance in respect of injury or death to a single person or for property damage in a manner satisfactory to the Chief Operating Officer must be maintained through the Project and included in the Fee Proposal.

All insurance policies shall be endorsed to provide a minimum advance written notice of not less than thirty (30) days, in the event of cancellation, termination or reduction in coverage or limits, such notice to be made to the Chief Operating Officer.

The Proponent shall, as applicable, conform to and enforce strict compliance with the Occupational Health and Safety Act and for purposes of the Act be designated as the "constructor" for the Service.

The Proponent must adhere to all relevant Zoo policies, including, but not limited to, the Contractor Safety Policy, Working in the Vicinity of Animal Containments Policy and the Vehicles on Site Policy, copies of which the Chief Operating Officer, Toronto Zoo, shall supply to the Preferred Proponent.

8.2 **Indemnity**

The Proponent shall at all times well and truly save, defend, keep harmless and fully indemnify the Toronto Zoo, the Board of Management of the Toronto Zoo, the City of Toronto, the Toronto & Region Conservation Authority, and their servants, employees, officers, agents and invitees, from and against all actions, suits, claims, demands, losses, costs, charges, damages, and expenses, brought or made against or incurred by their servants, officers, employees, agents or invitees in any way relating,

directly or indirectly, to goods, material, articles or equipment supplied or to be supplied, or to the supplying of goods or services, pursuant to this Proposal, or any other claim, action, suit, demand, loss, cost, charge, damage or expense relating to copyright, trademark or patent with regard directly or indirectly with any such goods, services, material, articles or equipment or the supply or performance thereof.

8.3 **Addenda**

If it becomes necessary to revise any part of this RFP, the revisions will be by Addenda emailed to the Proponent or posted on the Toronto Zoo website. Proponents and prospective Proponents SHOULD MONITOR THIS SITE as frequently as they deem appropriate until the day of the deadline. Only answers to issues of substance will be posted. The Toronto Zoo reserves the right to revise this RFP up to the Closing Deadline. When an addendum is issued is issued the Closing date for submitting proposals may be revised by the Toronto Zoo if, in its opinion, determines more time is necessary to enable Proponents to submit their Proposals.

All Proponents must acknowledge receipt of all Addenda in the space provided on the Proposal Submission Form.

8.4 **Incurred costs**

The Proponent shall bear all costs and expenses with respect to the preparation and submission of its Proposal and the Proponent's participation in the proposal process (the "Proposal Costs"), including but not limited to: all information gathering processes, interviews, preparing responses to questions or requests for clarification from the Board and contract discussions and negotiations.

The Toronto Zoo shall not be responsible for or liable to pay any Proposal Costs of any Proponent regardless of the conduct or outcome of the Proposal Request, Purchase Order process, or Contract process.

8.5 The RFP does not constitute an offer or tender by the Toronto Zoo. Receipt of Proposals by the Toronto Zoo pursuant to this RFP or selection or notification confers no rights under any Proposal nor obligates the Toronto Zoo in any manner whatsoever.

8.6 **Liability of Errors**

While the Toronto Zoo has used considerable efforts to ensure an accurate representation of information in this Request for Proposal, the information contained in this Request for Proposal is supplied solely as a guideline for Proponents. The information is not guaranteed or warranted to be accurate by the Toronto Zoo, nor is it necessarily comprehensive or exhaustive. Nothing in this Request for Proposal is intended to relieve Proponents from forming their own opinions and conclusions with respect to the matters addressed in this Request for Proposal.

8.7 **Toronto Zoo Rights and Options Reserved:**

The Toronto Zoo reserves the right to award the contract to any proponent who will best serve the interest of the Toronto Zoo. The Toronto Zoo reserves the right, in its sole discretion, to exercise the following rights and options with respect to the proposal submission, evaluation and selection process under this RFP:

(a) To reject any or all proposals.
(b) To re-issue this RFP at any time prior to award of work.
(c) To cancel this RFP with or without issuing another RFP.
(d) To supplement, amend, substitute or otherwise modify this RFP at any time prior to the selection of one or more proponents for negotiation.
(e) To accept or reject any or all of the items in any proposal and award the work in whole or in part.

(f) To waive any informality, defect, non-responsiveness and/or deviation from this RFP and its requirements.

(g) To permit or reject at the Toronto Zoo's sole discretion, amendments (including information inadvertently omitted), modifications, alterations and/or corrections of proposals by some or all of the proponents following proposal submission.

(h) To request that some or all of the proponents modify proposals based upon the Toronto Zoo's review and evaluation.

(i) To request additional or clarifying information or more detailed information from any Proponent at any time, before or after proposal submission, including information inadvertently omitted by the proponent.

8.8 **Cancellation**

Nothing herein shall be construed as giving the Proponent the right to perform the services contemplated under this agreement beyond the time when such services become unsatisfactory to the Toronto Zoo; and in the event that the Proponent shall be discharged before all the services contemplated hereunder have been completed or the services are for any reason terminated, stopped or discontinued because of the inability of the Proponent to serve under this agreement, the Proponent shall be paid only for the portion of the work which shall have been satisfactorily completed at the time of termination.

8.9 **Ownership and Confidentiality of Board-Provided Data**

All correspondence, documentation and information provided by the Toronto Zoo staff to any bidder or prospective Bidder in connection with, or arising out of this RFP, the services or acceptance of the RFP:

8.9.1 is and shall remain the property of the Board;

8.9.2 must be treated by Proponents and Prospective Proponents as confidential;

8.9.3 must not be used for any purpose other than for replying to this RFP, and for fulfillment of any related subsequent agreement.

8.10 **Copyright:**

The final product and related materials from the work is to be for the exclusive use of the Toronto Zoo. The Toronto Zoo shall be the only and sole owner of the product and related materials for the sole and unfettered use by the Toronto Zoo. Upon payment of the said product and related materials by the Toronto Zoo, the successful bidder shall have no hold, proprietary claim, ownership, use of any kind, intellectual or otherwise nor shall there be any restrictions placed on the final product and related products by the successful bidder. By submitting a Proposal in this response to this RFP, the Bidder shall thereby acknowledges and agrees that the Toronto Zoo has exclusive ownership and sole and unfettered use of this final product and related products.

8.11 **Ownership and Disclosure of Proposal Documentation**

The documentation composing any Proposal submitted in response to this RFP, along with all correspondence, documentation and information provided to the Toronto Zoo by any Bidder in connection with, or arising of this RFP, once received by the Toronto Zoo:

8.11.1 Shall become property of the Toronto Zoo and may be appended to purchase order issued to the successful Bidder;

8.11.2 Shall be come subject to the *Municipal Freedom of Information and Protection of Privacy Act ("MFIPPA") and may be released pursuant to that Act*

Because of *MFIPPA*, prospective Bidders are advised to identify in their Proposal material any scientific, technical, commercial, proprietary or similar confidential information, the disclosure of which could cause them injury.

Each Bidder's name shall be made public. Proposals will be made available to member of the Board on a confidential basis and may be released to members of the public pursuant to *MFIPPA.*

8.12 **Conflict of Interest Statement**

In its Proposal, the Proponent must disclose to the Toronto Zoo any potential conflict of interest that might comprise the performance of the Work. If such a conflict of interest does exist, the Toronto Zoo may, at its discretion, refuse to consider the Proposal.

The Proponent must also disclose whether it is aware of any Toronto Zoo employee, member of board, agency or commission or employee thereof having a financial interest in the Proponent and the nature of that interest. If such an interest exists or arises during the evaluation process or the negotiation of the Agreement, the Toronto Zoo may, at its discretion, refuse to consider the Proposal or withhold the awarding of any agreement to the Proponent until the matter is resolved to the Toronto Zoo's sole satisfaction.

Proponents are cautioned that the acceptance of their Proposal may preclude them from participating as a Proponent in subsequent projects where a conflict of interest may arise. The Consultant(s) for this project may participate in subsequent/other Toronto Zoo projects provided the Consultant(s) has (have) satisfied pre-qualification requirement of the Toronto Zoo, if any and in the opinion of the Toronto Zoo, no conflict of interest would adversely affect the performance and successful completion of an Agreement by the Consultant(s).

If, during the Proposal evaluation process or the negotiation of the Agreement, the Proponent is retained by another client giving rise to potential conflict of interest, then the Proponent will so inform the Toronto Zoo. If the Toronto Zoo requests, then the Proponent will refuse the new assignment or will take steps as are necessary to remove the conflict of interest concerned.

8.13 **No Collusion**

A proponent shall not discuss or communicate, directly or indirectly, with any other Proponent or their agent or representative about the preparation of the Proposals, Each proponent shall attest by virtue of signing the Proposal Submission Form that its participation in the RFP process is conducted without any collusion or fraud. If the Toronto Zoo discovers there has been a breach of this requirement at any time, the Toronto Zoo reserves the right to disqualify the Proposal or terminate any ensuing Agreement.

8.14 **Governing Law**

This RFP and any quotation submitted in response to it and the process contemplated by this RFP including any ensuing Agreement shall be governed by the laws of the Province of Ontario. Any dispute arising out of this RFP or this RFP process will be determined by a court of competent jurisdiction in the Province of Ontario.

9.0 PROPOSAL FORM

The undersigned Proponent having reviewed and fully understood the RFP and all terms and conditions of the RFP and information provided, hereby submits the attached Proposal and supporting materials ("the Proposal") in accordance.

I/We acknowledge that we have received addendum _____ to _____ inclusive, and that all changes specified in the addenda/addendum have been included in the prices submitted.

I/We, hereby declare that the statements contained in the Proposal are in all respects true.

I/We, agree that this submission is being made without any collusion or fraud.

Proposal prices shall remain in effect for a period of one hundred & twenty (120) days from the Proposal due date.

The Board of Management of the Toronto Zoo reserves the right to reject any or all Proposals or to accept any Proposal, should it deem such action to be in its interests.

By signing and submitting this proposal, you are agreeing to the release of your proposal information, as deemed necessary by the Board, in order to conduct business associated with this proposal or project.

COMPANY INFORMATION	
Company Name:	
Name of authorized Signing Officer	Title:
Signature:	Date:
Contact Name:	Title:
Address:	
Telephone #:	Fax #:
Email:	Web Site:
HST #:	

NOTICE OF NO BID

INSTRUCTIONS:

It is important to the Toronto Zoo to receive a reply from all invited bidders. If you are unable, or do not wish to submit a bid, please complete the following portions of this form. State your reason for not bidding by checking the applicable box(es) or by explaining briefly in the space provided. It is not necessary to return any other Request for Proposal/Quotation/Tender documents or forms. Please just return this completed form by fax or by mail prior to the official closing date. Purchasing and Supply Fax Number: (416) 392-6711.

A Proposal/Quotation/Tender is not submitted for the following reason(s):			
	Project/quantity too large.	.	Project/quantity too small.
	We do not offer services or commodities to these requirements		Cannot meet delivery or completion requirement
	We do not offer this service or commodity.		Agreements with other company do not permit us to sell directly.
	Cannot handle due to present commitments.		Licensing restrictions
	Unable to bid competitively.		We do not wish to bid on this service or commodity in the future.
	Insufficient information to prepare quote/proposal/tender		Specifications are not sufficiently defined
	We are unable to meet bonding or insurance requirements.		

Other reasons or additional comments (please explain):

Company Name:	
Address	
Contact Person:	
Signature of Company Representative:	
Date:	
Phone Number:	
Email address	
Fax Number:	

This address label should be printed and affixed to the front of your sealed tender, quotation and proposal envelope/package submission. Toronto Zoo will not be held responsible for envelopes and packages that are not properly labelled or submitted to an address other than the one listed on this label.

SWISS CHALLENGE REQUEST FOR PROPOSAL - MAIN ENVELOPE

Vendor Name _____

SC-RFP# 01 (2018-03)-
Closing: Tuesday, 2018-04-17, 12:00 hours (noon) local time

TO BE RETURNED TO

TORONTO ZOO
C/O SUPERVISOR, PURCHASING & SUPPLY
ADMINISTRATIVE SUPPORT CENTRE
361A OLD FINCH AVE.
TORONTO, ONTARIO
M1B 5K7

ENVELOPE 1 – TEHCNICAL PROPOSAL

Vendor Name _____

SC-RFP# 01 (2018-03)-
Closing: Tuesday, 2018-04-17, 12:00 hours (noon) local time

TO BE RETURNED TO

TORONTO ZOO
C/O SUPERVISOR, PURCHASING & SUPPLY
ADMINISTRATIVE SUPPORT CENTRE
361A OLD FINCH AVE.
TORONTO, ONTARIO
M1B 5K7

ENVELOPE 2 – FINANCING MODEL AND REVENUE PROPOSAL

Vendor Name _____

SC-RFP# 01 (2018-03)-
Closing: Tuesday, 2018-04-17, 12:00 hours (noon) local time

TO BE RETURNED TO

TORONTO ZOO
C/O SUPERVISOR, PURCHASING & SUPPLY
ADMINISTRATIVE SUPPORT CENTRE
361A OLD FINCH AVE.
TORONTO, ONTARIO
M1B 5K7

FORM 1

POLICY TO EXCLUDE BIDS FROM EXTERNAL PARTIES INVOLVED IN THE PREPARATION OR DEVELOPMENT OF A SPECIFIC CALL/REQUEST

To ensure Fair and Equal Treatment in its competitive procurements, the Toronto Zoo will undertake to:

- disallow bidders/proponent from submitting a bid to any Tender, Quotation, or Proposal call in which the bidders/proponent has participated in the preparation of the call document; and
- a bidder/proponent who fails to comply will result in disqualification of their response to the call/request.

Did you, the proponent, assist the Toronto Zoo in the preparation of this Request for Proposal call?

Specify: Yes _____ No _____

FORM 2

ENVIRONMENTALLY RESPONSIBLE PROCUREMENT STATEMENT

The Toronto Zoo Environment First Policy encourages bidders to also offer products/services that are environmentally preferred.

Environmentally preferred products/services offered must be competitive in cost, conform to specifications, performance requirements and, be suitable for the intended application as determined by the using department(s)

Environmentally preferred products/services are those such as durable products, reusable products, energy efficient products, low pollution products/services, products (including those used in services) containing maximum levels of post-consumer waste and/or recyclable content, and products which provide minimal impact to the environment.

An environmentally preferred product is one that is less harmful to the environment than the next best alternative having characteristics including, but not limited to the following:

1. Reduce waste and make efficient use of resources: An Environmentally Preferred Product would be a product that is more energy, fuel, or water efficient, or that uses less paper, ink, or other resources. For example, energy-efficient lighting, and photocopiers capable of double-sided photocopying.
2. Are reusable or contain reusable parts: These products such as rechargeable batteries, reusable building partitions, and laser printers with refillable toner cartridges.
3. Are recyclable: A product will be considered to be an Environmentally Preferred Product if local facilities exist capable of recycling the product at the end of its useful life.
4. Contain recycled materials: An Environmentally Preferred Product contains post-consumer recycled content. An example is paper products made from recycled post-consumer fibre.
5. Produce fewer polluting by-products and/or safety hazards during manufacture, use or disposal: An EPP product would be a non-hazardous product that replaces a hazardous product.
6. Have a long service-life and/or can be economically and effectively repaired to upgraded.

Bidders shall if requested, provide written verification of any environmental claims made in their bid/Proposal satisfactory to the Toronto Zoo within five (5) working days of request at no cost to the Zoo. Verification may include, but not be limited to, certification to recognized environmental program (e.g., Environmental Choice Program [ECP]), independent laboratory tests or manufacturer's certified tests, Only proven environmentally preferred products/services shall be offered. Experimental or prototype products/services will not be considered.

A copy of the Toronto Zoo Environment First Policy can be provided upon request.

State if environmentally preferred products/service is being offered: YES / NO
State briefly the environmental benefit of the product/service offered:

MAGNOVATE

Efficient, Quiet & Sustainable Ground Transportation

A Collaborative Proposal for:

The Toronto Zoo

March 2016

www.magnovate.com

Table of Contents

1. Vendor Profile

1.1 Magnovate

Magnovate was founded to commercialize Magline, a proprietary magnetic levitation (maglev) powertrain platform that enables a whole new generation of advanced transit systems. Our portfolio is to expand the practical applications of maglev technology to power efficient, economical and sustainable high efficiency and performance transit networks. Magline technology comprises pivotal developments that overcome the technical and economic limitations that have prevented the widespread adoption of maglev drive systems. These advances include innovations in suspension, power train, track and switching. Magline is nearly silent and frictionless and runs on any source of electric power, including solar, wind and hydro.

Magnovate is the lynchpin of a consortium that includes several multi-billion dollar international industrial leaders who are all committed to creating a complete maglev transportation industry in Canada. The Magnovate consortium will provide end-to-end services, from planning and analysis, infrastructure and vehicle manufacturing and operations, to ticket, routing, and condition based maintenance.

1.2 The Consortium

Magnovate's engineering and science partners have worked on maglev satellite launch systems, and invented maglev heart valves… and now the first maglev automated transit system with passive switching capabilities. Our industrial consortium includes:

Lockheed Martin: This aerospace leader will be the systems integrator for the Maglev Ride at the Toronto Zoo.

PCL Construction: PCL's civil construction companies possess the ingenuity and the experience needed to undertake any civil structure imaginable, from bridges, overpasses, tunnels and interchanges, to water treatment facilities, pipelines, and light-rail transportation projects; with competitive pricing, financial strength, and integrity.

Stantec Engineering: Stantec's leadership and experience in transit infrastructure extends to some of the most innovative systems in North America, including management of complete light rail projects, track work, design of individual components, stations, bridges, and mechanical and electrical systems. Stantec will support the Condition Based Maintenance program of all Magline systems.

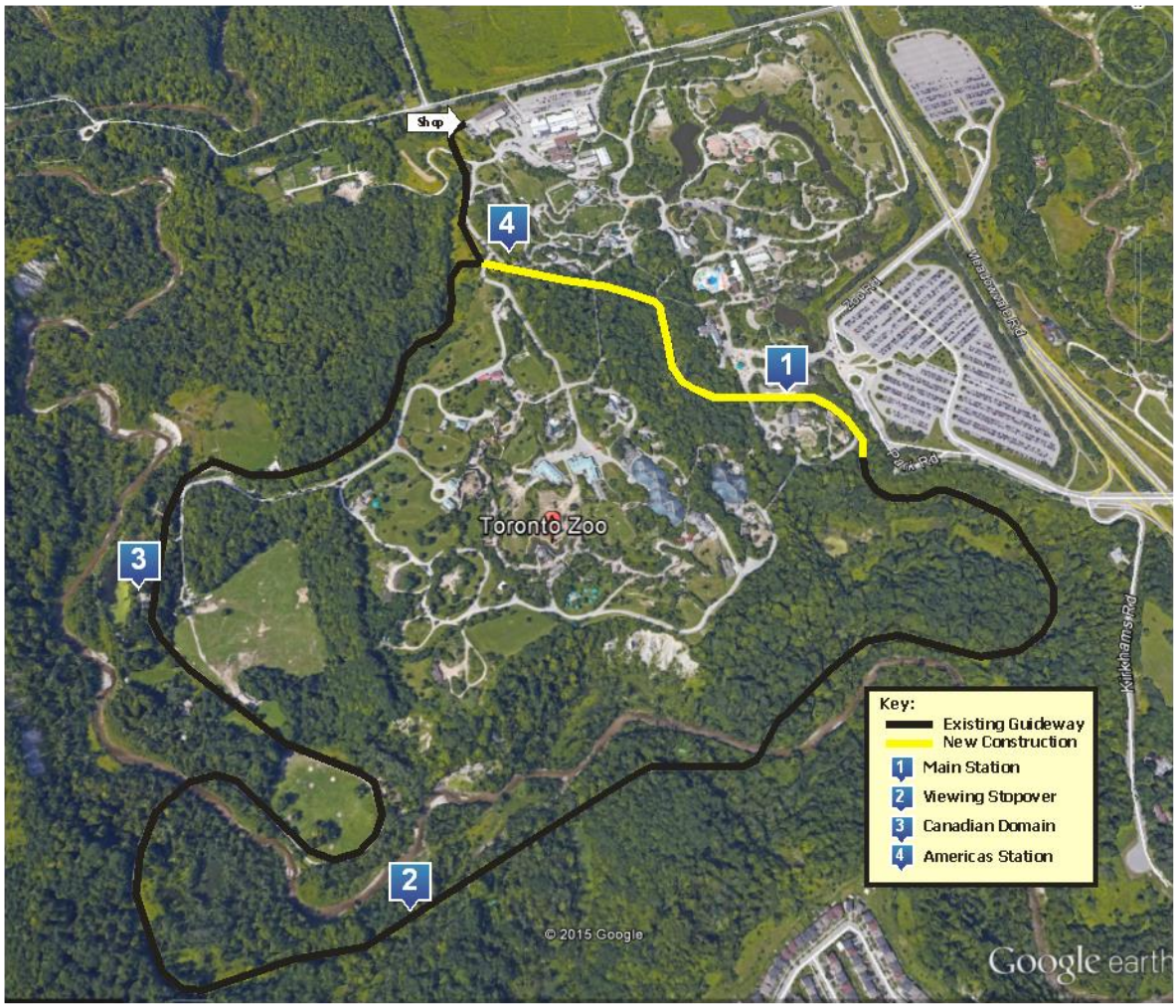
Magna International: Magna, the most diversified automotive supplier in the world, will build Magline vehicles. Magna has 305 manufacturing operations and 88 product development, engineering and sales centers in 27 countries on five continents.

2. Proposal Overview

2.1 Zoo Transit System

Magnovate proposes to build a Maglev Ride on the guideway and other existing ride infrastructure at the Toronto Zoo. A map of the ride is depicted below.

Maglev Ride Map



2.2 Synergies

The proposed project will accomplish several goals important to the mission of the Toronto Zoo and to Magnovate.

Toronto Zoo: As one of the top Zoo's in the world the Toronto Zoo has taken a leadership role in green initiatives and in reducing its ecological footprint. To fulfill its mission and progress towards realizing its vision the Toronto Zoo has set out a strategy that includes investing in the Zoo's infrastructure and support systems with a commitment to state-of-the-art facilities, equipment and environmental best practices.

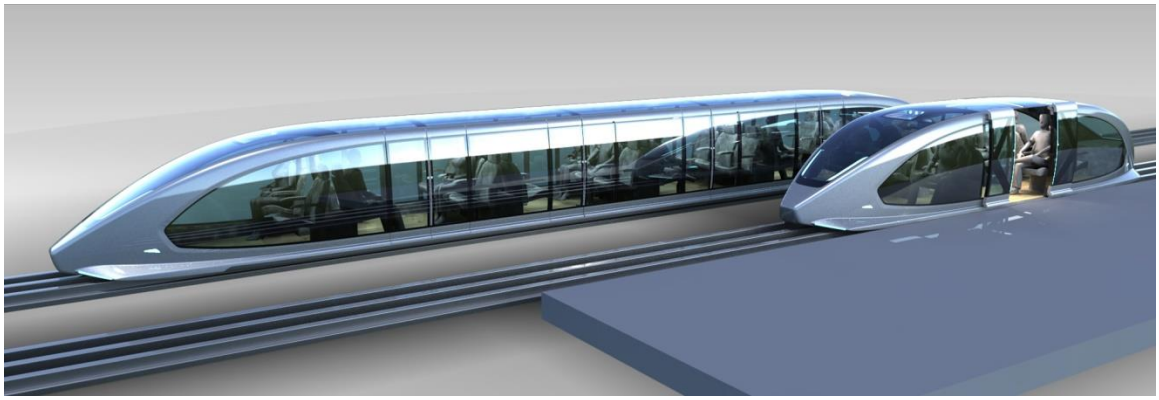
Magnovate: Magnovate has developed and tested prototypes of Magline, a breakthrough green and sustainable transit system. The existing infrastructure at the Zoo would be an ideal place to begin building the world's first commercial Magline system. It is well matched to Magline technology from a structural perspective, and obviates the substantial cost of building infrastructure from scratch for our development program.

2.3 Proposal

Magnovate proposes collaboration with the Toronto Zoo to build a Maglev Ride on the zoo campus that will not only serve the practical transportation needs of visitors, but also create a new attraction to bring visitors desirous of riding on the first commercial maglev transit system on our continent.

2.4 Technology

Magnovate's technology is a breakthrough development of maglev (magnetic levitation) propulsion. It is a silent, frictionless and highly energy efficient powertrain that can run without recourse to carbon-based fuels. Solar panels mounted on stations and on other elements of the infrastructure can supply much of the system's day-to-day power requirements.[1]



[1] A more complete discussion of Magline Technology is included in Appendix A.

3. Objectives

3.1 Toronto Zoo Objectives

- **Maglev Ride**: Provide visitor transit so that it is easier for small children, mobility impaired and seniors to enjoy the Canadian Domain and other distant exhibits.
- **Environmental Leadership:** Express in a tangible, powerful way the zoo's commitment to energy efficiency, green and sustainable business practices. Tangibly exhibit Toronto Zoo's leadership in fighting global climate change.
- **Public Relations/Marketing**: Installation of the Maglev Ride at the Zoo is a genuinely newsworthy event. Local and national press will cover the story and that will create a substantial wave of interest and positive coverage. It will enhance the stature of the Zoo and bring visitors.
- **Added Attraction**: Building a modern and truly unique transit system creates a new attraction to the Zoo. Some people who may not have otherwise visited may come to see and experience the Maglev Ride. Word of mouth about the attraction will result in repeat visitors to the Zoo.
- **Revenue**: Ticket sales for the new ride will grow Zoo revenue by attracting new guests and more revenue per visitor.
- **Low Capital Outlay**: The new Maglev Ride will be designed to make maximum use of the existing infrastructure including rights of way, stations, and towers which will minimize capital expenditures. Further, the Magnovate Consortium and Sustainable Technology Development Canada will contribute considerable resources.

3.2 Magnovate Objectives

- **Commercial Installation**: The Toronto Zoo represents a unique opportunity because so much of the Domain Ride infrastructure remains in place.
- **Showcase**: This project represents a breakthrough opportunity to introduce this cutting edge technology to the market place, to the press, to the general public, to government agencies, to investors and to both public and private prospects from all over the world.
- **Sustainable Development Technology Canada**: This project is a keystone to completion of our quest to qualify for coordinating funding and business development support from SDTC.

4. Work Plan & Deliverables

4.1 Three-Phase Project

The project is designed with three major phases. For Phase 1, we will analyze, design, construct and test a full scale Maglev vehicle specific to the Maglev Ride. In Phase 2, we will construct the full scale track and integrate the control system. In Phase 3 we will test the system on site at the Zoo. Note that some of the development activities of the three phases will overlap with each other. A detailed Gantt chart is included in Appendix C.

- **Phase 1:Full-scale Maglev Lab Test System**

  Timeline: 15 months

A full-scale laboratory test vehicle will be designed, constructed, tested and refined until it meets Phase 2 operational requirements. The vehicle will include a fully functional maglev suspension, low-power linear motor, digital control system, and off-board power supply. A test track will be designed and constructed, including one second-generation maglev switch and 20 meters of track. Operational requirements will include stable levitation during acceleration, deceleration, and transition through the switch before advancing to Phase 2.

- **Phase 2: Production Maglev Demonstration System**

  Timeline: 24 months

Production-quality vehicles will be designed, constructed, and tested on the Phase 2 track. The vehicles will include the same operational features as the Phase 1 vehicle but will use production quality materials and components. The passenger cabins will include full amenities, including HVAC and an entertainment system. Production quality track elements and segments will be designed, fabricated and tested on the Phase 2 track. Production drawings for the vehicles and track elements will be produced. A traffic control system will be deployed and tested on the Stage 2 track.

- **Phase 3: Commisioning/Safety Certification**

  Timeline: 7 months

Work with the TSSA and Transport Canada to obtain safety certification then begin commercial operations.

4.2 Budget

Maglev Ride Budget			
15 months			
1) Site-Specific Detailed Engineering	**Cost**	**% of Milestone**	**% of Total**
Project Management/Customer interface	175,000	17.5%	
Systems Engineering Management	90,000	9%	
Vehicles	75,000	7.5%	
Suspension	125,000	12.5%	
Magnetic Tracks	50,000	5%	
Maintenance Yard / Equipment	10,000	1%	
Energy Supply Systems	75,000	7.5%	
Command and Control System	260,000	26%	
Guideway Structure	70,000	7%	
Project Integration	70,000	7%	
Total	**$1,000,000**	**100%**	**5%**
24 months			
2) Construction	**Cost**	**% of Milestone**	**% of Total**
Project Management/Customer interface	850,000	5%	
Systems Engineering Management	700,000	4%	
Manufacture 12 Vehicles	4,200,000	19%	
Suspension	400,000	2%	
Magnetic Tracks	7,500,000	40%	
Energy Supply Systems	530,000	3%	
Command and Control System	368,000	2%	
Guideway Structure	4,000,000	22%	
Station renovations	330,000	1.0%	
Project Integration	368,000	2%	
Total	**$19,246,000**	**100%**	**92%**
7 months			
3) Commissioning	**Cost**	**% of Milestone**	**% of Total**
Project Management/Customer interface	100,000		
Safety Planning 4%	20,000	4%	
Failure Mode Effects Analysis	20,000	4%	
Test Planning 5%	25,000	5%	
Component Acceptance Test	80,000	16%	
System Acceptance Test	90,000	18%	
Training	30,000	20%	
Energy	65,000	13%	
Project Integration	170,000	20%	
Total	**$ 600,000**	**100%**	**3%**
Total Project Value	**$20,846,000**		100.00%
Total with Contingency (20%)	**$25,015,200**		

5. Controls & Constraints

5.1 Project Management Controls

The Magnovate Consortium will deploy the best practices of engineering project management to assure that the new Maglev Ride achieves the highest levels of quality and safety in its construction and operation. The sections that follow are an outline of the methodology that the Consortium will use. We will develop specific detail as part of the System Requirements Review and Preliminary Design Review, described below.

System Requirements Review (SRR)
This review examines the functional and performance requirements defined for the system by Toronto Zoo and the Magnovate Consortium and drafts the preliminary project plan. This is to ensure that the requirements and the selected concept will satisfy the overall mission of both parties.

Preliminary Design Review (PDR)
The preliminary design review documents that the initial design meets all system requirements with acceptable risk and within the cost and schedule constraints while establishing the basis for proceeding with a detailed design. It will show that the correct vehicle, infrastructure and control design options have been selected, and that all interfaces have been identified, and verification methods described.

PDR Objectives:

- Ensure that all system requirements have been allocated, the requirements are complete, and the flow down is adequate to verify system performance
- Show that the proposed design is expected to meet the functional and performance requirements
- Show sufficient maturity in the proposed design approach to proceed to final design
- Show that the design is verifiable and that the risks have been identified, characterized, and mitigated where appropriate

Critical Design Review (CDR)
The CDR demonstrates that the maturity of the design is appropriate to support proceeding with full-scale fabrication, assembly, integration, and testing. CDR determines that the technical effort is on track to complete the Magline system development and ride mission operations while meeting performance requirements within the identified cost and schedule constraints.

Objectives:

- Ensure that the "build-to" baseline contains detailed hardware and software specifications that can meet functional and performance requirements
- Ensure that the design has been satisfactorily audited by production, verification, operations, and other specialty engineering organizations
- Ensure that the production processes and controls are sufficient to proceed to the fabrication stage
- Establish that planned Quality Assurance (QA) activities will establish perceptive

verification and screening processes for producing a quality product
- Verify that the final design fulfills the specifications established at PDR

Test Readiness Review (TRR)
Our TRR will ensure that the Magline infrastructure and vehicles, as well as the test facility, support personnel, and test procedures are ready for testing and data acquisition, reduction, and control.

5.2 Independent Review/Oversight

In addition to the best practices described above, the Magnovate Consortium proposes an additional measure to manage risk and help ensure the successful development and safe operation of the new Maglev Ride. The Consortium will arrange for the participation of an independent review/oversight organization, Urban Systems Laboratories (Urban Systems), to represent the interests of the Zoo and the appropriate municipal and provincial agencies throughout the project. The participation of Urban Systems will be funded through a cost-sharing arrangement in which the Consortium share is placed at the disposal of the Zoo and agencies to contract with Urban Systems for activities within the context of this specific purpose.

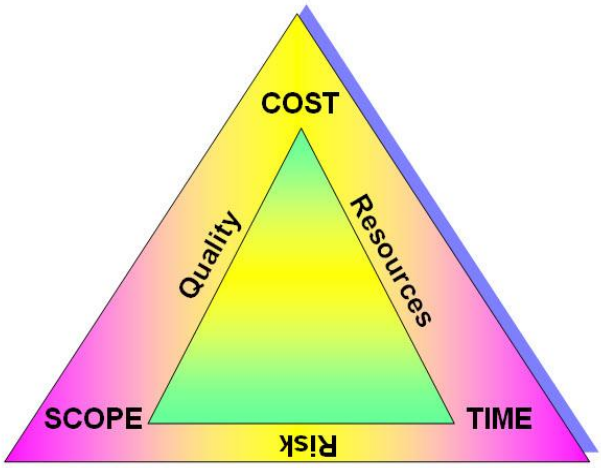
Urban Systems Laboratories is a U.S. non-profit dedicated to assisting governments in their efforts to develop large-scale technologies in support of smart/sustainable cities goals. It is uniquely qualified to serve the interests of the Zoo and government authorities on the new Maglev Ride project as it is the only organization with expertise in Automated Transit Networks that has an expressed non-advocacy, public-interest charter. Under its Pathfinder Cities Program, it is currently working with the City of San José, CA to put in place a comprehensive, full-scale, ATN development program to meet that city's needs.

Urban Systems will perform objective analyses and oversight relating to requirements definition, system architecture and evolution trade studies, technical and programmatic review as part of the design review process described above, independent cost and performance analyses, and, most importantly, interfacing with regulatory authorities to develop the necessary certification program that will ensure the safety and reliability of the attraction.

The inclusion of this independent analysis and review function is also important for another reason: just as the Maglev Ride project will serve as a demonstration of this new technology and add to the Zoo's revenue portfolio, the public-interest regulatory and certification standards that Urban Systems will develop in conjunction with the relevant authorities will serve as a foundation for broader local objectives. It will pave the way for other potentially more expansive and economically desirable applications that the City of Toronto may want to consider as part of its overall mobility and sustainability efforts, all with the confidence that the public's interest has been taken into account.

5.3 Constraints

Magnovate recognizes that the challenge of every project is to make it work within the classic Triple Constraint; the interaction of quality (scope), cost (resources) and schedule (time). These three elements of a project must necessarily work in tandem with one another. Where one of these elements is restricted or extended, the Project Manager must adjust the other two elements to re-balance. The Project Manager shoulders the ongoing responsibility to monitor, analyze, and re-balance the three elements by careful planning, ongoing coordination, thoughtful resourcing and expeditious execution. Magnovate will assure project success for the Toronto Zoo project by coordinating activities and deliverables.



- **Rigorous Review Process:** The Magnovate Consortium will implement a thorough planning, testing and review methodology as outlined in section 5.1. A Gantt chart and resource diagram will be created to monitor the timeline, budget, percentage of completion for each milestone, and dependency relationships.
- **TSSA Approval:** Magnovate will engage with the TSSA in year one of the project to develop a plan for achieving TSSA approval so that the Magline ride will be certified to transport passengers by the end of the project.
- **Environmental Approvals:** Our consortium partner, Stantec Consulting, will work with environmental authorities to obtain all necessary environmental approvals.

6. Reporting & Project Management

6.1 Milestone Reports

As the project proceeds through a series of milestones, the project team will report on the results of the prior milestone and produce specific plans for the upcoming milestone using the format below.

Milestone #:	**1**	**Activity Period**	**[DATE]**	**to**	**[DATE]**
Objective:	Complete a revised preliminary project plan and determine the functional and performance requirements for the system				

Item	Milestone Deliverable	Metrics/Success Criteria	Completion Date
1	System Requirements	System Requirements Review/The requirements and selected concept satisfy all project goals	[DATE]
2	Preliminary Project Plan	System Requirements Review/The plan incorporates any changes due to results of development work prior to project start and includes all tasks required to accomplish project goals within the cost and time allotted	[DATE]

6.2 Report Format

The project team will produce reports in a form and level of detail as agreed between the team and the Toronto Zoo management.

7. Magnovate& Toronto Zoo Responsibilities

7.1 Magnovate Consortium & Responsibilities

The Magnovate Consortium will assume responsibility for design, construction and testing of the Toronto Zoo project, with the following understandings:

- **Collaboration on Design:** The Consortium and the Toronto Zoo will collaborate and cooperate in good faith to achieve the agreed project mission.
- **Costs:** Magnovate will assume full responsibility for financing the project and for coordinating, and raising, all necessary funding to complete the project.
- **Operations:** Magnovate will be responsible for the maintenance of the equipment and infrastructure after implementation.
- **Difference Resolution:** The Consortium and the Toronto Zoo will conduct ad hoc meetings as necessary and regular scheduled meetings to discuss all aspects of the project. The parties agree to negotiate in good faith to resolve any and all differences that may arise. Where negotiations prove ineffective, the parties agree to an informal mediation process.

7.2 Pricing/Ridership & Revenue

The Toronto Zoo offers several rides/climb, the prices of these are as listed below.

- TundraAir Ride, Cost per ride is $12.00 or four tickets for $40.00
- Gorilla Climb Ropes Course, Cost per climb is $8.00
- Zoomobile Ride Ride-all-day pass costs $8.00, and four ride-all-day passes cost $28.00

The estimated optimal price for the Maglev Ride at the Toronto Zoo is $12.00, which is reasonable compared to above benchmarks. However, due to the high-quality service and excellent view of the zoo provided by the Maglev Ride, it is possible that the revenue could be further enhanced if more information is available such as a preference survey conducted on existing and potential zoo visitors.

Historical Domain Ride Ridership

The Toronto Zoo Domain Ride was in service from 1976 to 1994. The historical Toronto Zoo Domain Ride ridership is shown below. It can be seen from that the percent of Toronto Zoo visitors that chose to ride the Domain Ride was 27 to 30 percent of the total zoo attendance with the average capture rate of 28%. The ridership ranged from 298,039 to 353,995 from 1990 to 1993.

Toronto Zoo Domain Ride Ridership

Year	Zoo Attendance	Domain Ride Ridership	Percent of Zoo Visitors for Domain Ride
1990	1,194,143	353,995	30%
1991	1,282,595	353,203	28%
1992	1,122,700	298,039	27%
1993	1,186,001	327,029	28%

Source: Attendance and ridership data provided by Toronto Zoo

Historical Toronto Zoo Attendance

The Zoo attendance from 2009 to 2013 is shown below:

Year	Zoo Attendance
2009	1,459,574
2010	1,308,788
2011	1,241,695
2012	1,286,673
2013	1,462,910
Average	**1,351,928**

Source: Attendance data provided by Toronto Zoo

Ridership and Revenue Projection

Magnovate has based the ridership projections on the assumption that the Maglev Ride will have the same average capture rate as the Domain Ride (28%) and that the average attendance (1,352,000) will result in annual ridership of **378,560**. Therefore, with a ticket price of $12, the annual revenue is expected to be **$4,542,720**.

7.3 Benefits/Risk Sharing

- Magnovate has paid for a guideway inspection that was performed by Stantec which concludes that the existing structure is in very good condition.
- The Liability is solely Magnovate's for the first 5 years. Magnovate will assume full responsibility for expenses caused by or arising out of the acts, omissions, errors or negligence of Magnovate during the 5 year period. The Zoo will assume liability when the Maglev Ride is accepted by the Zoo after 5 years.
- Magnovate will be responsible for the maintenance of the equipment and infrastructure after implementation. After 5 years Magnovate agrees to continue maintaining the Maglev Ride on a service agreement basis and provide access to replacement parts and to qualified technicians to perform regular maintenance and repairs. Subsequent to the completion of the Maglev Ride at the Toronto Zoo, Magnovate has a number of significant maglev deployments lined up that will be deployed from 2020-2030, so the Toronto Zoo can be assured that it will have access to replacement parts and a robust team of technicians to ensure that the Maglev Ride is serviced properly.
- Magnovate and the Toronto Zoo will share the revenue on a 50/50 basis with financing costs coming out of operating revenue.
- In recognizing that visitor attendance drops in the off-season Magnovate will establish an operating reserve fund as a contingency to ensure that operations can be paid for in the case that revenue from ticket sales is not sufficient in certain months.
- The term of the revenue share agreement shall be 5 years.

7.4 Contract Terms

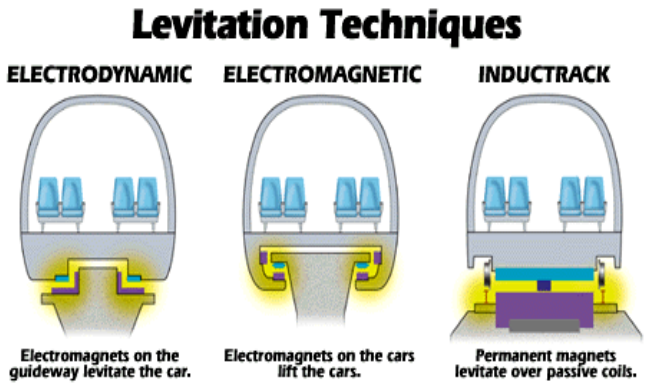
- Magnovate will assume full responsibility for raising and coordinating funding to complete the Project.
- Magnovate and the Toronto Zoo will cooperate on securing pending government grant funding and other relevant sources of financing.
- Specifications and milestones for the project plan will be agreed on in advance.
- Magnovate will operate and maintain the ride for a fee that is agreeable to Magnovate and the Toronto Zoo. Operations and financing will be paid out of the total revenue and then Magnovate and the Toronto Zoo will share the revenue on a 50/50 basis.

Appendix A: MaglineTechnology

Maglev Technology

Magnetic levitation (maglev) using magnetic forces to float a vehicle on a guideway eliminates traction and friction and so enables quick acceleration and deceleration and very high speeds. Maglev is also unaffected by weather and uses less energy than conventional high speed rail. Cars riding on magnetic cushions are quiet, smooth and comfortable. Reduced friction has made maglev trains that were built as demonstration projects to showcase the technology to hold the speed record for rail transportation for decades. Eliminating friction also reduces energy use quite substantially, especially in low speed installations. Presently, there are two commercial maglev trains in operation, with two others under construction. The Transrapid in Shanghai, began commercial operations in 2004, and the Linimo began relatively low-speed HSST operations in Japan in March 2005.

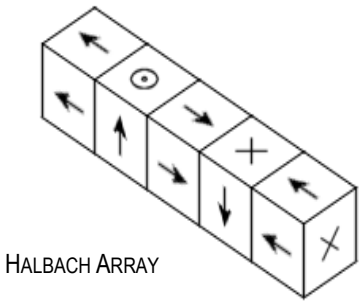
Generally, a horizontal set of magnets levitates the vehicle vertically above the track and a vertical set at the sides stabilizes the vehicle from side to side and keeps it on the track. With conventional maglev, narrow levitation gaps must remain in precise and stable alignment. In virtually all current designs, either the suspension components must wrap around the track edges or the tracks must wrap around the suspension, making switching cumbersome, slow and expensive. Due to these and other technical limitations, only two maglev systems are currently under construction; one in China and another in South Korea.



Prefabricated, robust sections of precision concrete rail with magnetic materials embedded are expensive to fabricate, to transport to building sites, and to assemble and maintain in precise alignment. They also present enormous switching challenges. Tiny levitation gaps mean that heavy, cumbersome sections must be moved mechanically and realigned perfectly in order to direct a vehicle from one track to another. Slow switch speeds limit the performance and efficiency of high speed rail and so most installations comprise a single line connecting stations. Magline makes complex, intricate networks feasible as it cuts infrastructure costs.

Magline Solutions

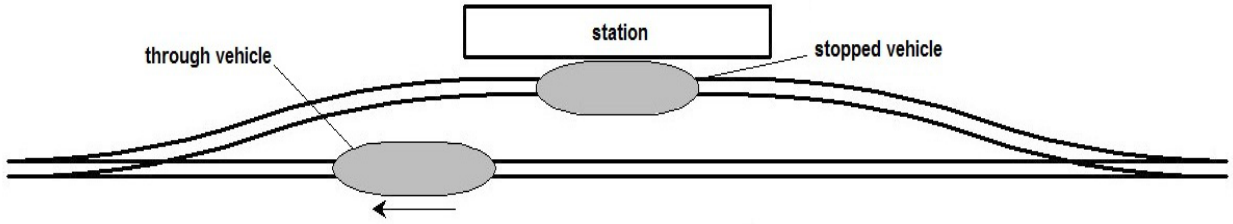
Magline technology fundamentally alters the state of the art and vastly broadens the range of applications possible for maglev transit. The vertical levitation gap of Magline design is an order of magnitude larger than those of existing designs, obviating the need for close-tolerance track alignment, and permitting the use of lighter rails, bridges and other infrastructure to substantially reduce costs.


HALBACH ARRAY

Based on a "Halbach Array" of magnets, Magline technology can switch tracks without mechanically moving the guideway. It thus can achieve high-speed passive switching while maintaining lateral stability and directional control using much lighter guideways. Magline automation enables vehicles to run safely with short headways.

Lightweight Infrastructure

Lightweight infrastructure brings several advantages, especially when systems operate using off-line stations and individual vehicles instead of trains. Eliminating massive, heavy trains of cars further reduces the need for mammoth bridges and other extra heavy infrastructural components. Computer controlled individual vehicles running at short headway distances and high speeds can create many new operating efficiencies because they are able to bypass one another at stations and employ network routing. Off-line stations enable vehicles with no disembarking passengers to bypass stations where vehicles ahead may have stopped. That creates smooth traffic flows and stop-start efficiencies. Vehicles arrive more frequently and stop only where passengers aboard hold tickets, reducing wait and travel times.



Substantially less expensive infrastructure means developers can add more links, loops and hubs to create a larger network and to serve more populations even those remote from major cities. Bypassing "loops" off the main line bring operating advantages similar to off-line stations. The greater the number of hubs in the network, the greater the number of possible paths between destinations. Computers can reroute vehicles at every hub to avoid slow-downs.

Friction

Although most vehicles consume most energy to overcome air drag at speeds over 100 kph, thermal and frictional losses are also quite significant even at low speed. Maglev converts relatively small amounts of its power to heat losses and virtually none to mechanical friction. A maglev vehicle carrying four passengers and cruising at 120 kph would require about 7.5 kilowatts of power, or about 0.06 kWh per kilometer, costing about half a cent per km. An automobile that gets 50 km/gal costs more than 8 cents/km. Fuel savings and limited heat losses combine with low maintenance costs to achieve unprecedented low operating costs. Magline is the perfect choice for the Toronto Zoo, and it will herald many other new possibilities because it is sustainable, safe and automated transit with low power consumption while being very quiet and having smooth operation.

Appendix B: Maglev Ride Safety Features

Magnovate recognizes that safety is of primary importance to the Toronto Zoo. The following section provides an overview the Maglev Ride safety features and demonstrates how the safety and redundancy of the technology are clearly aligned with the safety priorities of the Toronto Zoo.

Safety and Redundancy of Magline

The vehicle control system architecture will be such that the probability of a complete power failure will be extremely low. Electronics will be implemented with the safety critical design tools used in commercial aircraft control design. In such flight control systems, the death rate associated with electronic system failures is less than one death per billion passenger hours of travel. By way of comparison, overall road travel and air travel numbers are ~330 and ~380 deaths per billion hours respectively. Conventional rail is much better with an overall death rate of ~20 deaths per billion hours [Norman Bradbury, "Face the facts on transport safety," Railwatch, pages 6-7, November 2002]. When expressed on a per-mile basis, air travel is very safe as is well-known.

The key system-level methods to ensure safe and reliable operation of electronic systems are *redundancy* and *fault-isolation*. In reference to the Figure 1 below, a non-redundant system has a given mean-time to failure (MTTF) and fails when a single subsystem has a fault. A brute force approach to improving safety is to add a copy of the original system in parallel and, assuming simple failure statistics, the MTTF is increased by only 50% as the rate of failure doubles until the first redundant system fails. However, by including means to isolate faulty subsystems and switch in back-up subsystems, a large number of faults can be tolerated as shown. As a result of fault-isolation architectures, extraordinary reliability and safety are achieved in commercial aircraft (see FAA FAR25.1309 and advisory circular AC25.13091A).

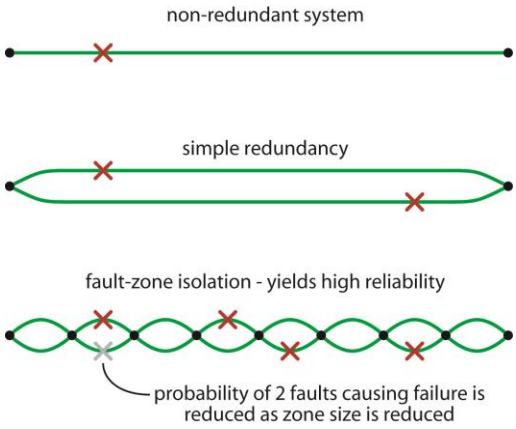


***Figure1*. Schematic diagram of electronic systems and fault tolerance.**

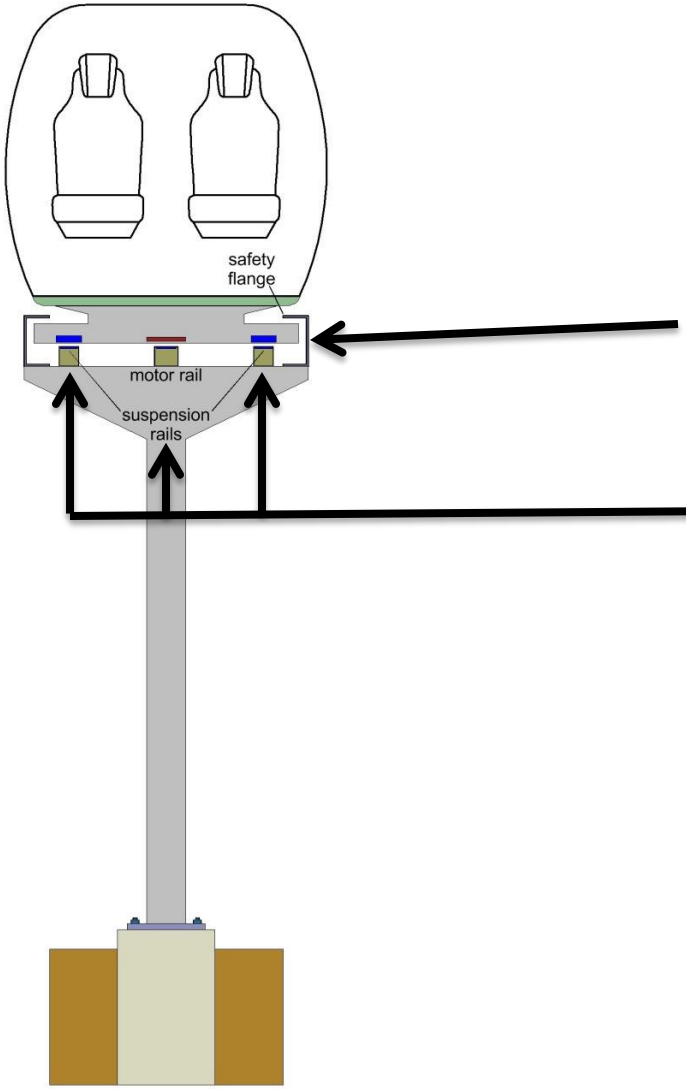
Consider, for example, the reliable operation of the Maglev vehicle power supply to the lateral control coils. The architecture consists of 3 power sources: a 3rd rail, generator coils on the vehicle coupled to the linear (short-stator) motor magnet array on the track, and back-up batteries. If the 3rd rail power or pick-up system fails, this subsystem is disconnected ("fault-isolated"), and the generator coils are used to convert kinetic energy of the vehicle to power for the electrical systems. The vehicle can then be safely decelerated and at some minimum threshold the back-up batteries provide power to a complete stop. Further, the back-up battery system will not be comprised of one large pack of cells and one large power electronics unit. Rather, it will consist of N smaller subsystems of which N-1 or N-2 are sufficient to power the lateral control. The details of such designs are assessed via a fault-tree analysis where probabilities are assigned to the branches and architectures are modified to meet specifications. Such analyses are based on well-established field data on electronic component failures.

Magnovate Transportation Inc

Toronto Zoo Maglev Ride – Safety Features

www.magnovate.com

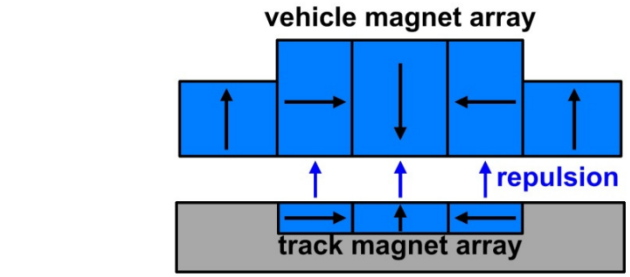
Guideway Configuration



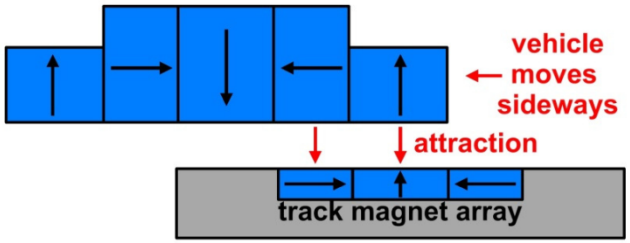
A safety flange prevents the vehicle from leaving the guideway under any circumstances.

The track consists of two suspension rails and one motor rail.

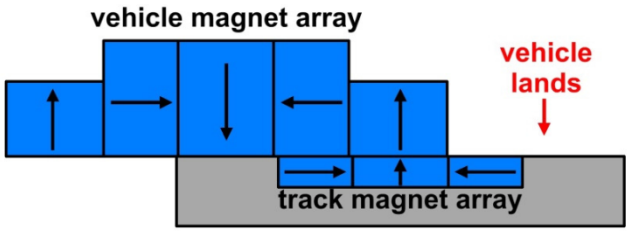
Emergency Brake Operation



Each suspension rail interacts with a magnet array on the vehicle. In normal operation electromagnets keep the vehicle arrays centered above the rails, where repulsive magnetic force levitates the vehicle.



Power cannot be interrupted unless there are multiple failures in the control system. Such an event would result in the magnetic levitation becoming magnetic attraction and cause the vehicle to move sideways and slowly come to a stop.



Brake pads control friction between the vehicle and rails while the safety flange limits sideways motion. After the cause of the problem is corrected, the vehicle can be re-levitated and returned to service.

Safety Features

Fail safe emergency braking requires no action by an operator or the vehicle control system – it happens automatically if the control system or vehicle power fails.

Regenerative electrodynamic brakes are highly reliable due to few moving parts and will be included on the vehicles for use during normal operation.

Redundant systems ensures there's always a backup.

Levitation eliminates friction resulting in higher reliability due to less wear and tear.

Automated control eliminates driver errors.

Appendix C: Gantt Chart

Gantt Chart - Toronto Zoo Maglev Ride Development

Task	Task Lead	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
1. Project Management/Customer interface	Magnovate																																	
2. Safety Planning/Test Planning	Urban Systems																																	
3. Systems Engineering Management	Magnovate																																	
4. Environmental Approval	Stantec																																	
5. Vehicle Development	MetalBoss																																	
a. Vehicle exterior design	MetalBoss																																	
b. Cabin interior design, selection of components	MetalBoss																																	
c. Tooling design	MetalBoss																																	
a. Build tooling for one prototype vehicle	MetalBoss																																	
b. Procurement of components	MetalBoss																																	
c. Assemble 1 prototype vehicle	MetalBoss																																	
d. Test prototype vehicle	Magnovate																																	
e. Design iteration (if necessary)	MetalBoss																																	
f. Manufacture 11 production vehicles	Magna																																	
Chassis/Frame	Magnovate																																	
a. Structural design/analysis	Magnovate																																	
b. Detailed design	Magnovate																																	
c. Generate drawings and specifications	Magnovate																																	
d. Fabrication and assembly	MetalBoss																																	
Propulsion	Magnovate																																	
a. Propulsion system trade studies	Magnovate																																	
b. Motor specifications	Magnovate																																	
c. Motor electronics design/analysis	Magnovate																																	
d. Motor electronics procurement/assembly	Magnovate																																	
e. Build and test demonstrator coil/magnets	Magnovate																																	
f. Incorporation of lessons learned into final design	Magnovate																																	
g. Motor coil assembly manufacture	Magnovate																																	
Lateral control	Magnovate																																	
a. Lateral control system design/analysis	Magnovate																																	
b. Procurement, assembly & test of a demonstrator	Magnovate																																	
c. Design improvements	Magnovate																																	
d. Lateral control subsystem manufacture	Magnovate																																	
Vertical control	Magnovate																																	
a. Verticalcontrol system design/analysis	Magnovate																																	
b. Procurement, assembly & test of a demonstrator	Magnovate																																	
c. Design improvements	Magnovate																																	
d. Vertical control subsystem manufacture	Magnovate																																	
On-vehicle power generation/storage	Magnovate																																	
a. Develop procurement specifications	Magnovate																																	
b. Detailed design of mechanical parts, test equip	Magnovate																																	
c. Manufacturing/procurement of components	Magnovate																																	
Signaling System	Lockheed Martin																																	
a. Requirement generation	Lockheed Martin																																	
b. Design modeling and simulation program	Lockheed Martin																																	
c. Develop modeling and simulation program	Lockheed Martin																																	
d. Develop signaling system	Lockheed Martin																																	
e. Install and test signaling system	Lockheed Martin																																	
6. Track Development	Magnovate																																	
a. Suspension rail magnet design/analysis	Magnovate																																	
b. Motor rail magnet design/analysis	Magnovate																																	
c. Prototype magnet fabrication (short test track)	Magnovate																																	
d. Manufacture straight track sections	Magnovate																																	
e. Bifurcation fabrication	Magnovate																																	
f. Installation of track on guideway	Magnovate																																	
7. Guideway	Stantec																																	
a. Guideway drawings	Stantec																																	
b. Design pre-cast concrete forms	Armtec																																	
c. Construction planning	Armtec																																	
d. Clean/pressure wash existing guideway	PCL																																	
e. Manufacture guideway	Armtec																																	
f. Install guideway	Armtec																																	
8. Station Renovations	PCL																																	
a. Renovation planning/Materials list	PCL																																	
b. Order materials	PCL																																	
c. Renovate stations	PCL																																	
9. System level assembly, integration, preliminary testing	Lockheed Martin																																	
a. Single vehicle tests on track	Lockheed Martin																																	
b. Vehicle performance limit testing	Lockheed Martin																																	
c. Multiple vehicle tests on track	Lockheed Martin																																	
10. Commissioning	Urban Systems																																	
a. Safety testing	Urban Systems/Transport Canada																																	
b. Failure Mode Effects Analysis	Urban Systems																																	
c. Component Acceptance Test	Urban Systems																																	
d. System Acceptance Test	Transport Canada																																	
e. Employee Training	Magnovate																																	
11. Grand Opening	Toronto Zoo/Magnovate																																	